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10/574,478	04/03/2006	Yoshihide Kawaguchi	Q93964	2362
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EXAMINER				
PAUL, JESSICA MARIE				
ART UNIT		PAPER NUMBER		
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06/26/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary****Application No.**

10/574,478

**Applicant(s)**

KAWAGUCHI ET AL.

**Examiner**

Jessica Paul

**Art Unit**

4171

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/29/06 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/CS-100)  
Paper No(s)/Mail Date 11/29/06 and 4/3/06

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_

## DETAILED ACTION

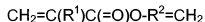
### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Nobuyuki and Mitsuru (JP 64-013139).
3. Regarding claims 1-6, the applicant requires a photochemically refractive-index-changing polymer wherein the polymer is one of (A) a homopolymer comprising an acrylic vinyl monomer represented by formula (i):



Wherein  $\text{R}^1$  is a hydrogen atom or a methyl group and  $\text{R}^2$  is a saturated or unsaturated hydrocarbon group having 1-20 carbon atoms, provided that the monomer may have one or more heteroatom(s) and one or more halogen atoms in the molecule; (B) a copolymer comprising two or more acrylic vinyl monomers represented by formula (i); or (C) a copolymer comprising one or two or more acrylic vinyl monomers represented by formula (i) and one or more monomers other than acrylic vinyl monomers; and wherein the polymer has a radical-polymerizable side-chain vinyl group remaining in the molecule and, upon irradiation, undergoes a refractive-index increase through the irradiation of 0.005 or more (as measured by the m-Line method in the TE mode). The applicant further claims the photochemically refractive-index-changing

Art Unit: 1796

polymer, wherein 90% or more of the radical-polymerizable side-chain vinyl groups remain in the molecule, a stereoregularity of 70% or higher, wherein the radiation is ultraviolet, and irradiation dose of 10 J/cm<sup>2</sup> or less.

4. Nobuyuki and Mitsuru disclose a polymer with a photopolymerizable compound consisting of a monomer having at least one ethylencially unsaturated group which can be photopolymerized by active rays. The photopolymerizable compound is selected from allyl(meth)acrylate or (meth)acrylic acid, and other additional polymerizable vinyl monomer copolymers. The high sensitivity to the active rays of a wide region from UV light to visible light is thereby obtained (abs).

5. The composition of Nobuyuki and Mitsuru correspond to the composition claimed by the applicant. Since the structure of the molecules are the same, the examiner has reason to believe that the change in refractive index, vinyl group side-chains, stereoregularity, and ultraviolet radiation are merely inherent properties of the disclosed invention. If the same composition is being cured under identical conditions, the resulting properties would also inherently be identical.

6. Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Andrews (US Patent No. 4293674).

7. Regarding claims 1-6, Andrews teaches a dienyI methacrylate, a curable compound of formula (ii):

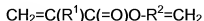


Wherein R is an alkadienyl or cyclodienyl group which contains the 1,3- or 1,4-diene carbon skeleton, homopolymers and copolymers of the compound, and curable finishes containing the homopolymer and/or copolymer (abs). In the instance that Andrews R is the 1,3-diene, formula (ii) provided by the prior art, is identical to formula (i) provided by the instant application, wherein R<sup>1</sup> is a methyl group and R<sup>2</sup> is an unsaturated hydrocarbon chain containing three carbons. The examiner takes note that the ethylenic unsaturation of the compound disclosed by Andrews, provides the capability of polymerization via ultraviolet radiation.

8. The composition of Andrews corresponds to the composition claimed by the applicant. Since the structure of the molecules are the same, the examiner has reason to believe that the change in refractive index, vinyl group side-chains, stereoregularity, and ultraviolet radiation are merely inherent properties of the disclosed invention. If the same composition is being cured under identical conditions, the resulting properties would also inherently be identical.

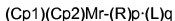
9. Claims 17 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Yanagase et al. (US Patent No 6160070).

10. Claim 17 of the instant application, the applicant requires a process for producing a photochemically-refractive-index-changing polymer, which comprises subjecting a monomer, which is (a) an acrylic vinyl monomer represented by formula (i):



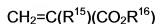
Wherein  $R^1$  is a hydrogen atom or a methyl group and  $R^2$  is a saturated or unsaturated hydrocarbon group having 1-20 carbon atoms, provided that the monomer may have one or more heteroatom(s) and one or more halogen atoms in the molecule, (b) two or more of the acrylic vinyl monomers represented by formula (i), or (b) one or two or more of the acrylic vinyl monomers represented by formula (i) and one or more other monomers to anionic polymerization using as a polymerization initiator a metal complex catalyst including a rare earth metal as an active center to thereby obtain the photochemically refractive-index-changing polymer as discussed above.

11. Claim 18 of the instant application claims the process for producing a photochemically refractive-index-changing polymer, wherein the metal complex catalyst including a rare earth metal as an active center is a metal complex compound represented by the following formula (iii):



Wherein Cp1 and Cp2 each independently is a substituted or unsubstituted cyclopentadienyl;  $M_r$  is a rare earth metal atom having a valence of r (integer from 2-4), R is a hydrogen or a 1-3 carbon linear alkyl chain, L is a solvent, p and q are integers of 0-2 and selected to satisfy  $r: r = p+2$ .

12. Yanagase et al. discloses a process for the preparation of a poly-(meth)acrylate ester, which comprises, upon anionic polymerization of a (meth)acrylate ester usually a compound selected by the following formula (vi):



Wherein R<sup>15</sup> represents a hydrogen atom or a methyl group and R<sup>16</sup> represents a monovalent group selected from the group consisting of aliphatic hydrocarbon groups, aromatic hydrocarbon groups, and hydrocarbon groups containing a functional group such as an ether bond or an amino group. Specific examples include ethyl methacrylate and allyl methacrylate. The polymerization of the (meth)acrylate ester takes place by using an organometallic compound ((C<sub>5</sub>Me<sub>5</sub>)<sub>2</sub>SmMe(thf) or the like); thf is tetrahydrofuran, a solvent molecule.

In the instance that R<sup>1</sup> in formula (i) of the instant application is a methyl group and R<sup>2</sup> is one or two carbon atoms, formula (ii) of the instant application consists of R as one methyl and L is tetrahydrofuran; the compounds would be identical, and therefore, all limitations as claimed by applicant in claims 17 and 18 are encompassed entirely by the disclosed invention of Yanagase et al.

### ***Claim Rejections - 35 USC § 103***

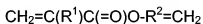
13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 7-9 and 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andrews as applied to claims 1-6 above, and further in view of Yeshin (US Patent No 3615448).

15. Claim 7 of the instant application requires a photochemically refractive-index-changing polymer as taught in claims 1-6, which further comprises at least one member selected from a photoinitiator, a sensitizer, and a chain transfer agent, capable of radiation that undergoes a change in refractive index upon irradiation.

16. Regarding claims 8, 9, and 11-13 the applicant claims requires a photochemically refractive-index-changing polymer wherein the polymer is one of (A) a homopolymer comprising an acrylic vinyl monomer represented by formula (i):



Wherein  $\text{R}^1$  is a hydrogen atom or a methyl group and  $\text{R}^2$  is a saturated or unsaturated hydrocarbon group having 1-20 carbon atoms, provided that the monomer may have one or more heteroatom(s) and one or more halogen atoms in the molecule; (B) a copolymer comprising two or more acrylic vinyl monomers represented by formula (i); or (C) a copolymer comprising one or two or more acrylic vinyl monomers represented by formula (i) and one or more monomers other than acrylic vinyl monomers; and wherein the polymer has a radical-polymerizable side-chain vinyl group remaining in the molecule, and at least one member selected from a photoinitiator, a sensitizer, and a chain transfer agent, wherein upon irradiation, undergoes a refractive-index increase through the irradiation of 0.005 or more (as measured by the m-Line method in the TE mode). The applicant further claims the photochemically refractive-index-changing polymer, a stereoregularity of 70% or higher, wherein the radiation is ultraviolet, and irradiation dose of  $10 \text{ J/cm}^2$  or less.



Art Unit: 1796

17. Claims 14-16 of the instant application require a method of refractive index regulation, wherein the photochemically refractive-index-changing polymer according to claim 7, is irradiated with a radiation to thereby cause the polymer or composition to undergo a refractive-index increase through the irradiation of 0.005 or more (as measured by the m-Line method in the TE mode). The method, wherein the radiation is ultraviolet and the dose of ultraviolet is  $10 \text{ J/cm}^2$ .

18. As stated above in paragraph 7, Andrews teaches a dieny methacrylate, a photopolymerizable compound that is identical to the composition claimed by the applicant. Andrews fails to teach the addition of a photoinitiator, sensitizer, or a chain transfer agent, as well as the method for curing via UV radiation.

19. Yeshin teaches a photocurable composition containing finely divided particles of a vinyl plastic, the vinyl plastic is preferred to be a homopolymer of vinyl chloride (abs). Example 19 discloses a homopolymer of allyl acrylate was used in place of the homopolymer of vinyl chloride (col16, line13), a photoinitiator was added, and the composition could either be cured by visible or ultraviolet light. In the instance that  $R^1$  of formula (i) of the instant application is hydrogen and  $R^2$  is two carbon atoms, the structure of the composition as claimed by the instant application would be identical to the structure as claimed of the patented invention disclosed by Yeshin.

20. As previously stated, the composition of Andrews in combination with the composition of Yeshin corresponds to the composition claimed by the applicant. Since the structure of the molecules are the same, the examiner has reason to believe that the change in refractive index, vinyl group side-chains, stereoregularity, and dose of

Art Unit: 1796

ultraviolet radiation are merely inherent properties of the disclosed invention. If the same composition is being cured under identical conditions, the resulting properties would also inherently be identical.

21. It would have been obvious, to one having ordinary skill in the art, to take a vinyl methacrylate monomer as taught by Andrews, with a photoinitiator under ultraviolet radiation, as taught by Yeshin, with motives to produce a refractive-index-changing polymer as claimed by the instant application, with motives to achieve faster cure speeds with altered physical properties based on the desired product.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessica Paul whose telephone number is (571)270-5453. The examiner can normally be reached on Monday thru Friday 7:30a - 5:00p; alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1796

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ling-Siu Choi/  
Primary Examiner, Art Unit 1796

Jessica Paul  
Examiner  
Art Unit 4171

/JMP/